



TETRA TECH NUS

PHIL-21222

**TO:** RUSS TURNER **DATE:** JULY 17, 2007  
**FROM:** MEGAN N. RITCHIE **COPIES:** FILE  
**SUBJECT:** INORGANIC DATA VALIDATION – METALS, CYANIDE, PERCENT SOLIDS  
NAS JRB WILLOW GROVE SITE 3, WILLOW GROVE, PENNSYLVANIA  
SDG NO. C7E090120  
**SAMPLES:** 1/Aqueous/  
FB-050807  
2/Solid/  
03TP18-0203-01      03TP18-0203-04

## OVERVIEW

The sample set for the NAS JRB Willow Grove Site 3 Test Pits – Willow Grove, PA, SDG C7E090120 consists of 2 solid environmental samples (designated 03TP18-) and one field quality control (QC) blank (designated FB-). No samples were designated as the matrix spike and matrix spike duplicate (MS/MSD) for this sample set. One field duplicate pair (03TP18-0203-01/03TP18-0203-04) was included in this sample set. All samples were analyzed for target analyte list (TAL) metals and cyanide, except FB-050807 which was analyzed for cyanide only.

The samples were collected by Tetra Tech NUS on May 8, 2007 and analyzed by Severn Trent Laboratories (STL) of Pittsburgh, Pennsylvania.

EPA SW-846 Methods were conducted using 6010B for ICP-AES metals, 7471A for mercury, and 9012A for cyanide. Percent solids were analyzed by EPA Method 160.3 modified.

## SUMMARY

Most analytes were successfully analyzed in all samples. The findings offered in this report are based upon a general review of all available data including data completeness, holding times until analysis, calibration data, laboratory blank results, ICP interference check samples, matrix spike (MS) and matrix spike duplicate (MSD) results, laboratory control spike (LCS) results, field duplicate results, ICP serial dilution results, detection limits, and analyte quantitation.

Areas of concern with respect to data quality are listed below as follows:

## MAJOR PROBLEMS

- Selenium, sodium, and thallium exhibited negative concentrations with absolute values greater than the MDL in ICS solution A, which indicates the potential for negative bias to an extent that depends on the sample mineral concentrations. For non-detected selenium, sodium, and thallium results, when the MDL was less than the absolute value of the predicted magnitude of negative interference, such results were qualified as unusable (UR).

## MINOR PROBLEMS

- Arsenic, beryllium, and sodium exhibited a negative concentration with an absolute value greater than the MDL in ICS solution A, which indicates the potential for negative bias to an extent that depends on the sample mineral concentrations. For positive arsenic, beryllium, and sodium results, when the sample concentration was less than 10 times the absolute value of the expected interference, such results were qualified as biased low (L).
- Selenium exhibited a negative concentration with an absolute value greater than the MDL in ICS solution A, which indicates the potential for negative bias to an extent that depends on the sample mineral concentrations. For non-detected selenium results, when the absolute value of the predicted magnitude of negative interference was less than the MDL but more than one-tenth of the MDL, such results were qualified as biased low (UL).
- The MSD recovery for copper exceeded the upper QC limit of 120%. All positive results for copper were qualified as biased high (K), except where superseded by the estimated qualifier (J) for field duplicate precision.
- The MS/MSD recoveries for antimony and mercury were below the lower QC limit of 80%. All positive and non-detected results for antimony and mercury were qualified as biased low (L/UL), except where superseded by the estimated qualifier (J) for field duplicate precision.
- The field duplicate relative percent differences (RPDs) for cadmium, calcium, chromium, copper, iron, mercury, nickel, silver, and zinc exceeded the QC limit of 50%. The positive results for these analytes were qualified as estimated (J).
- The field duplicate results for antimony exceeded precision criteria. The absolute difference between the two results was not less than 2X the detection limit. The positive and non-detected results for antimony were qualified as estimated (J/UJ).

## NOTES

Aluminum, antimony, barium, beryllium, cobalt, manganese, potassium, thallium, and zinc were detected in the laboratory blanks. No action was taken for these analytes because the results exceeded the action level or there were no positive results for these analytes.

The cyanide and percent solids data are acceptable as reported by the laboratory.

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Russ Turner  
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## EXECUTIVE SUMMARY

**Laboratory Performance:** Many analytes displayed signals with absolute values greater than the MDL in the ICP Interference Check Sample A. Four of these analytes may have produced bias in sample analyses. Several analytes were present in the laboratory blanks.

**Other Factors Affecting Data Quality:** MSD recoveries were outside QC criteria for two analytes..

The data for these analyses were reviewed with reference to the EPA "Functional Guidelines for Inorganic Data Review", as amended for use within EPA Region 3 (4/93).

The text of this report has been formatted to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the Functional Guidelines and the Quality Assurance Project Plan (QAPjP)."

Megan N. Ritchie  
Megan N. Ritchie  
Chemist

Russ Sloboda  
Tetra Tech NUS, Inc.  
Russ Sloboda  
Data Validation Quality Assurance Officer

### Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

## **APPENDIX A**

### **Qualified Analytical Results**

**PROJ\_NO:** 2192

SDG: C7E090120 MEDIA: SOIL DATA FRACTION: M

nsample	03TP18-0203-01
samp_date	5/8/2007
lab_id	C7E090120002
qc_type	NM
units	MG/KG
Pct_Solids	82.0
DUP_OF:	

nsample	03TP18-0203-04
samp_date	5/8/2007
lab_id	C7E090120003
qc_type	NM
units	MG/KG
Pct_Solids	80.0
DUP_OF:	03TP18-0203-01

Parameter	Result	Val Qual	Qual Code
ALUMINUM	25200		
ANTIMONY	0.39	UJ	DG
ARSENIC	3.8		
BARIUM	162		
BERYLLIUM	0.98	L	K
CADMIUM	2.7	J	G
CALCIUM	777	J	G
CHROMIUM	14.7	J	G
COBALT	9.1		
COPPER	90.5	J	DG
IRON	21500	J	G
LEAD	688		
MAGNESIUM	877		
MANGANESE	738		
MERCURY	0.078	J	DG
NICKEL	20.1	J	G
POTASSIUM	368		
SELENIUM	0.32	UL	K
SILVER	1.1	J	G
SODIUM	26.2	L	K
THALLIUM	0.55	UR	K
VANADIUM	19.5		
ZINC	151	J	G

Parameter	Result	Val Qual	Qual Code
ALUMINUM	28300		
ANTIMONY	4	J	DG
ARSENIC	2	L	K
BARIUM	155		
BERYLLIUM	0.67	L	K
CADMIUM	13.7	J	G
CALCIUM	1300	J	G
CHROMIUM	25.2	J	G
COBALT	8.4		
COPPER	421	J	DG
IRON	87100	J	G
LEAD	450		
MAGNESIUM	767		
MANGANESE	926		
MERCURY	0.19	J	DG
NICKEL	33.8	J	G
POTASSIUM	249		
SELENIUM	0.65	UR	K
SILVER	3.7	J	G
SODIUM	39	UR	K
THALLIUM	1.1	UR	K
VANADIUM	17.9		
ZINC	954	J	G

**PROJ\_NO:** 2192

SDG: C7E090120 MEDIA: WATER DATA FRACTION: MISC

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nsample FB-050807  
samp\_date 5/8/2007  
lab\_id C7E090120004  
qc\_type NM  
Pct\_Solids  
DUP\_OF:

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	UG/L	10	U	

**PROJ\_NO:** 2192

SDG: C7E090120 MEDIA: SOIL DATA FRACTION: MISC

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nsample	03TP18-0203-01	nsample	03TP18-0203-04
samp_date	5/8/2007	samp_date	5/8/2007
lab_id	C7E090120002	lab_id	C7E090120003
qc_type	NM	qc_type	NM
Pct_Solids	82.0	Pct_Solids	80.0
DUP_OF:		DUP_OF:	03TP18-0203-01

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.61	U	
PERCENT SOLIDS	%	82.2		

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.62	U	
PERCENT SOLIDS	%	80.2		

**Data Qualifier Key:**

- B - Positive result is considered to be an artifact of blank contamination and should not be considered present.
- J - Value is considered estimated due to exceedance of technical quality control or because result is less than the Contract Required Quantitation Limit (CRQL).
- L - Positive result is considered biased low due to exceedance of technical quality control criteria.
- U - Value is a non-detected result as reported by the laboratory.
- UL - Non-detected result is considered biased low due to exceedance of technical quality control criteria.

**Qualifier Codes:**

- a = Lab Blank Contamination
- b = Field Blank Contamination
- c = Calibration (i.e., %RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
- d = MS/MSD Noncompliance
- e = LSC/LSCD Noncompliance
- f = Laboratory Duplicate Imprecision
- g = Field Duplicate Imprecision
- h = Holding Time Exceedance
- i = ICP Serial Dilution Noncompliance
- j = GFAA PDS – GFAA MSA's  $r < 0.995$  (correlation coefficient)
- k = ICP Interference – include ICSAB %Rs
- l = Instrument Calibration Range Exceedance
- m = Sample Preservation
- n = Internal Standard Noncompliance
- o = Poor Instrument Performance (i.e. baseline drifting)
- p = Uncertainty Near Detection Limit (<2 x IDL for inorganics and < CRQL for organics)
- q = Other Problems (can encompass of number of issues)
- r = Surrogates Recovery Noncompliance
- s = Pesticide/PCB Resolution
- t = % Breakdown Noncompliance for DDT and Endrin
- u = Pesticide/PCB % Difference Between Columns for Positive Results
- v = Non-linear Calibrations, Tuning  $r < 0.995$  (correlation coefficient)

## **APPENDIX B**

**Results as Reported by the Laboratory**

## Tetra Tech NUS, Inc

Client Sample ID: 03TP18-0203-01

## TOTAL Metals

Lot-Sample #...: C7E090120-002

Matrix.....: SOLID

Date Sampled...: 05/08/07

Date Received..: 05/09/07

% Moisture....: 18

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
		LIMIT	UNITS				
Prep Batch #...:	7135204						
Silver	1.1	0.61	mg/kg	SW846 6010B		05/15-05/18/07 JWJLN1AG	
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.036	
Aluminum	25200	24.3	mg/kg	SW846 6010B		05/15-05/18/07 JWJLN1AH	
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.97	
Arsenic	3.8	1.2	mg/kg	SW846 6010B		05/15-05/18/07 JWJLN1AJ	
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.40	
Barium	162	24.3	mg/kg	SW846 6010B		05/15-05/18/07 JWJLN1AK	
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.12	
Beryllium	0.98	0.49	mg/kg	SW846 6010B		05/15-05/18/07 JWJLN1AL	
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.051	
Calcium	777	608	mg/kg	SW846 6010B		05/15-05/18/07 JWJLN1AM	
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 4.8	
Cadmium	2.7	0.61	mg/kg	SW846 6010B		05/15-05/18/07 JWJLN1AN	
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.085	
Cobalt	9.1	6.1	mg/kg	SW846 6010B		05/15-05/18/07 JWJLN1AP	
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.064	
Chromium	14.7	0.61	mg/kg	SW846 6010B		05/15-05/18/07 JWJLN1AQ	
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.11	

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## Tetra Tech NUS, Inc

Client Sample ID: 03TP18-0203-01

## TOTAL Metals

Lot-Sample #....: C7E090120-002

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK
		LIMIT	UNITS			ANALYSIS DATE	ORDER #
Copper	90.5	3.0	mg/kg		SW846 6010B	05/15-05/18/07	JWJLN1AR
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.14	
Iron	21500	12.2	mg/kg		SW846 6010B	05/15-05/18/07	JWJLN1AT
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 2.2	
Potassium	368 J,B	608	mg/kg		SW846 6010B	05/15-05/18/07	JWJLN1AU
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 9.1	
Magnesium	877	608	mg/kg		SW846 6010B	05/15-05/18/07	JWJLN1AV
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 1.2	
Manganese	738	1.8	mg/kg		SW846 6010B	05/15-05/18/07	JWJLN1AW
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.014	
Sodium	26.2 J	608	mg/kg		SW846 6010B	05/15-05/18/07	JWJLN1AX
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 19.0	
Nickel	20.1	4.9	mg/kg		SW846 6010B	05/15-05/18/07	JWJLN1AO
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.15	
Lead	688	0.73	mg/kg		SW846 6010B	05/15-05/22/07	JWJLN1A1
		Dilution Factor: 2		Analysis Time...: 12:16		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.39	
Antimony	ND	1.2	mg/kg		SW846 6010B	05/15-05/18/07	JWJLN1A2
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.39	
Selenium	ND	0.61	mg/kg		SW846 6010B	05/15-05/18/07	JWJLN1A3
		Dilution Factor: 1		Analysis Time...: 15:34		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.32	

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## Tetra Tech NUS, Inc

Client Sample ID: 03TP18-0203-01

## TOTAL Metals

Lot-Sample #...: C7E090120-002

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK	ANALYSIS DATE	ORDER #
		LIMIT	UNITS						
Thallium	ND	1.2	mg/kg		SW846 6010B			05/15-05/18/07	JWJLN1A4
		Dilution Factor: 1			Analysis Time...: 15:34			Analyst ID.....: 022952	
		Instrument ID...: TRACEICP			MS Run #.....: 7135136			MDL.....: 0.55	
Vanadium	19.5	6.1	mg/kg		SW846 6010B			05/15-05/18/07	JWJLN1A5
		Dilution Factor: 1			Analysis Time...: 15:34			Analyst ID.....: 022952	
		Instrument ID...: TRACEICP			MS Run #.....: 7135136			MDL.....: 0.13	
Zinc	151 B	2.4	mg/kg		SW846 6010B			05/15-05/18/07	JWJLN1A6
		Dilution Factor: 1			Analysis Time...: 15:34			Analyst ID.....: 022952	
		Instrument ID...: TRACEICP			MS Run #.....: 7135136			MDL.....: 0.21	
Prep Batch #...:	7149212								
Mercury	0.078	0.040	mg/kg		SW846 7471A			05/29/07	JWJLN1AF
		Dilution Factor: 1			Analysis Time...: 13:59			Analyst ID.....: 400491	
		Instrument ID...: HGHYDRA			MS Run #.....: 7149129			MDL.....: 0.0086	

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated Result: Result is less than RL and greater than or equal to the MDL.

B Blank contamination: Target analyte was detected at a reportable level.

## Tetra Tech NUS, Inc

Client Sample ID: 03TP18-0203-04

## TOTAL Metals

Lot-Sample #....: C7E090120-003

Matrix.....: SOLID

Date Sampled...: 05/08/07

Date Received..: 05/09/07

% Moisture.....: 20

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
<b>Prep Batch #....: 7135204</b>						
Silver	3.7	0.62	mg/kg	SW846 6010B	05/15-05/18/07	JWJLQ1AR
		Dilution Factor: 1		Analysis Time...: 15:40	Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136	MDL.....:	0.037
Aluminum	28300	24.9	mg/kg	SW846 6010B	05/15-05/18/07	JWJLQ1AT
		Dilution Factor: 1		Analysis Time...: 15:40	Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136	MDL.....:	0.99
Arsenic	2.0	1.2	mg/kg	SW846 6010B	05/15-05/18/07	JWJLQ1AU
		Dilution Factor: 1		Analysis Time...: 15:40	Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136	MDL.....:	0.41
Barium	155	24.9	mg/kg	SW846 6010B	05/15-05/18/07	JWJLQ1AV
		Dilution Factor: 1		Analysis Time...: 15:40	Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136	MDL.....:	0.12
Beryllium	0.67	0.50	mg/kg	SW846 6010B	05/15-05/18/07	JWJLQ1AW
		Dilution Factor: 1		Analysis Time...: 15:40	Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136	MDL.....:	0.052
Calcium	1300	623	mg/kg	SW846 6010B	05/15-05/18/07	JWJLQ1AX
		Dilution Factor: 1		Analysis Time...: 15:40	Analyst ID.....:	022952
		Instrument ID...: TRACBICP		MS Run #.....: 7135136	MDL.....:	4.9
Cadmium	13.7	1.2	mg/kg	SW846 6010B	05/15-05/22/07	JWJLQ1AO
		Dilution Factor: 2		Analysis Time...: 12:21	Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136	MDL.....:	0.17
Cobalt	8.4	6.2	mg/kg	SW846 6010B	05/15-05/18/07	JWJLQ1AI
		Dilution Factor: 1		Analysis Time...: 15:40	Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136	MDL.....:	0.066
Chromium	25.2	1.2	mg/kg	SW846 6010B	05/15-05/22/07	JWJLQ1A2
		Dilution Factor: 2		Analysis Time...: 12:21	Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136	MDL.....:	0.23

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## Tetra Tech NUS, Inc

Client Sample ID: 03TP18-0203-04

## TOTAL Metals

Lot-Sample #....: C7E090120-003

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK
		LIMIT	UNITS			ANALYSIS DATE	ORDER #
Copper	421	3.1	mg/kg	SW846 6010B		05/15-05/18/07	JWJLQ1A3
		Dilution Factor: 1		Analysis Time..: 15:40		Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....:	0.14
Iron	87100	24.9	mg/kg	SW846 6010B		05/15-05/22/07	JWJLQ1A4
		Dilution Factor: 2		Analysis Time..: 12:21		Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....:	4.5
Potassium	249 J,B	623	mg/kg	SW846 6010B		05/15-05/18/07	JWJLQ1A5
		Dilution Factor: 1		Analysis Time..: 15:40		Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....:	9.3
Magnesium	767	623	mg/kg	SW846 6010B		05/15-05/18/07	JWJLQ1A6
		Dilution Factor: 1		Analysis Time..: 15:40		Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....:	1.3
Manganese	926	1.9	mg/kg	SW846 6010B		05/15-05/18/07	JWJLQ1A7
		Dilution Factor: 1		Analysis Time..: 15:40		Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....:	0.014
Sodium	ND	1250	mg/kg	SW846 6010B		05/15-05/22/07	JWJLQ1A8
		Dilution Factor: 2		Analysis Time..: 12:21		Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....:	39.0
Nickel	33.8	5.0	mg/kg	SW846 6010B		05/15-05/18/07	JWJLQ1AA
		Dilution Factor: 1		Analysis Time..: 15:40		Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....:	0.15
Lead	450	0.75	mg/kg	SW846 6010B		05/15-05/22/07	JWJLQ1AC
		Dilution Factor: 2		Analysis Time..: 12:21		Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....:	0.40
Antimony	4.0	2.5	mg/kg	SW846 6010B		05/15-05/22/07	JWJLQ1AD
		Dilution Factor: 2		Analysis Time..: 12:21		Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....:	0.80
Selenium	ND	1.2	mg/kg	SW846 6010B		05/15-05/23/07	JWJLQ1AE
		Dilution Factor: 2		Analysis Time..: 10:57		Analyst ID.....:	022952
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....:	0.65

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## Tetra Tech NUS, Inc

Client Sample ID: 03TP18-0203-04

**TOTAL Metals**

Lot-Sample #....: C7E090120-003

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING			METHOD	PREPARATION-	WORK	ORDER #
		LIMIT	UNITS					
Thallium	ND	2.5	mg/kg		SW846 6010B	05/15-05/22/07	JWJLQ1AF	
		Dilution Factor: 2			Analysis Time..: 12:21		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 1.1		
Vanadium	17.9	12.5	mg/kg		SW846 6010B	05/15-05/22/07	JWJLQ1AG	
		Dilution Factor: 2			Analysis Time..: 12:21		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.26		
Zinc	954 B	5.0	mg/kg		SW846 6010B	05/15-05/22/07	JWJLQ1AH	
		Dilution Factor: 2			Analysis Time..: 12:21		Analyst ID.....: 022952	
		Instrument ID...: TRACEICP		MS Run #.....: 7135136		MDL.....: 0.42		
Prep Batch #....: 7149212								
Mercury	0.19	0.041	mg/kg		SW846 7471A	05/29/07	JWJLQ1AQ	
		Dilution Factor: 1			Analysis Time..: 14:04		Analyst ID.....: 400491	
		Instrument ID...: HGHYDRA		MS Run #.....: 7149129		MDL.....: 0.0088		

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated Result: Result is less than RL and greater than or equal to the MDL.

B Blank contamination: Target analyte was detected at a reportable level.

**Willow Grove CTO 003**

***Cyanide, Total***

Lab Name:	STL PITTSBURGH	Method:	SW846	9012A
Client Name:	Tetra Tech NUS, Inc	Lot Number:	C7E090120	
Matrix:	SOLID			

**Distillation procedure**

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
03TP18-0203-01	C7E090120 002	JWJLN1A7	ND	mg/kg	0.12	0.61	1	5/9/2007 - 5/10/2007 17:02	7129293
03TP18-0203-04	C7E090120 003	JWJLQ1AJ	ND	mg/kg	0.12	0.62	1	5/9/2007 - 5/10/2007 17:02	7129293
FB-050807	C7E090120 004	JWJLT1AA	ND	ug/L	1.7	10.0	1	5/9/2007 - 5/10/2007 17:33	7129540

# Willow Grove CTO 003

## ***Percent Solids***

**Lab Name:** STL PITTSBURGH

**Method:** MCAWW 160.3 MOD

**Client Name:** Tetra Tech NUS, Inc

**Lot Number:** C7E090120

**Matrix:** SOLID

### **Total Residue as Percent Solids**

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
03TP18-0203-01	C7E090120 002	JWJLN1A8	82.2	%	0.0	1.0	1	5/9/2007 - 5/10/2007 10:30	7129406
03TP18-0203-04	C7E090120 003	JWJLQ1A9	80.2	%	0.0	1.0	1	5/9/2007 - 5/10/2007 10:30	7129406

## **APPENDIX C**

### **Support Documentation**

**CASE NARRATIVE  
TETRATECH NUS, INC.  
WILLOW GROVE  
CT0 003**

STL Lot #: C7E090120

**GC/MS Volatiles (cont):**

The method blank for batch 7131197 had methylene chloride detected below the reporting limit but above the MDL. The result was flagged with a "J" qualifier. Any sample associated with this blank that had methylene chloride detected had the result flagged with a "B" qualifier.

**GC/MS Semivolatiles:**

Sample 03TP18-0203-04 had internal standard chrysene-d12 area count not meet criteria. This sample was analyzed prior to the reported analysis and had this internal standard area count on the low side confirming matrix interference. Only one analysis is reported.

All non-CCC compounds that have >15% RSD were evaluated to see if a better curve could be drawn using a quadratic curve. All compounds <30% RSD will use and average response factor curve if no visible improvement is accomplished using a quadratic curve.

**Pesticides:**

All compounds <20% RSD will use an average response factor curve if no visible improvement is accomplished using a curve. A curve will be used for a compound where it is determined to be the "best-fit" evaluation.

**PCBs:**

There were no problems associated with the analyses.

**Metals:**

Sample 03TP18-0203-01 was over the instruments linear range for lead and required a dilution.

Sample 03TP18-0203-04 was over the instruments linear range for iron and required a dilution. This sample was also analyzed at a dilution for cadmium, chromium, sodium, lead, antimony, selenium, thallium, vanadium, and zinc due to inter-element corrections associated with iron.

The method blanks had analytes detected at concentrations between the MDL and the reporting limit. The results were flagged with a "B" qualifier. Any sample associated with a method blank that had the same analyte detected had the result flagged with a "J" qualifier.

The matrix spike and matrix spike duplicate recovered outside of the control limits for mercury.

**CASE NARRATIVE  
TETRATECH NUS, INC.  
WILLOW GROVE  
CT0 003**

**STL Lot #: C7E090120**

**General Chemistry:**

There were no problems associated with the analyses.

**Dioxins:**

STL Knoxville, TN performed the dioxin analysis. All data is included in the package.



INORGANIC INTERFERENCE CHECK SAMPLE VALIDATION

Affected Analyte	MDL	Sample	Reported Result	Qualifier	Interferent	Interferent level in ICS	Conc. ICS	Interferent Level	Est. Interference	Validation Action	Validation Action
Arsenic	2.3	03TP18-0203-01	30.91		Iron	200000	-1	176860	-0.88	na	na
Beryllium	0.31	03TP18-0203-01	8.06		Iron	200000	-1	176860	-0.88	L	na
Cadmium	0.47	03TP18-0203-01	22.16		Iron	200000	-1	176860	-0.88	na	na
Chromium	0.82	03TP18-0203-01	120.48		Iron	200000	1	176860	0.88	na	na
Copper	1.4	03TP18-0203-01	744.28		Iron	200000	-2	176860	-1.77	na	na
Manganese	0.27	03TP18-0203-01	6070.5		Iron	200000	4	176860	3.54	na	na
Nickel	1	03TP18-0203-01	164.93		Iron	200000	2	176860	1.77	na	na
Selenium	2.9	03TP18-0203-01		U	Iron	200000	-3	176860	-2.65	na	UL
Sodium	139	03TP18-0203-01	215.01		Iron	200000	-410	176860	-362.56	L	na
Thallium	3.2	03TP18-0203-01		U	Iron	200000	-8	176860	-7.07	na	UR
Vanadium	2.6	03TP18-0203-01	160.5		Iron	200000	2	176860	1.77	na	na
Zinc	3.5	03TP18-0203-01	1243.5		Iron	200000	5	176860	4.42	na	na

Affected Analyte	MDL	Sample	Reported Result	Qualifier	Interferent	Interferent level in ICS	Conc. ICS	Interferent Level	Est. Interference	Validation Action	Validation Action
Arsenic	2.3	03TP18-0203-04	16.2		Iron	200000	-1	673170	-3.37	L	na
Beryllium	0.31	03TP18-0203-04	5.39		Iron	200000	-1	673170	-3.37	L	na
Cadmium	0.47	03TP18-0203-04	55.05		Iron	200000	-1	673170	-3.37	na	na
Chromium	0.82	03TP18-0203-04	101.13		Iron	200000	1	673170	3.37	na	na
Copper	1.4	03TP18-0203-04	3375.9		Iron	200000	-2	673170	-6.73	na	na
Manganese	0.27	03TP18-0203-04	7426.8		Iron	200000	4	673170	13.46	na	na
Nickel	1	03TP18-0203-04	271.52		Iron	200000	2	673170	6.73	na	na
Selenium	2.9	03TP18-0203-04		U	Iron	200000	-3	673170	-10.10	na	UR
Sodium	139	03TP18-0203-04		U	Iron	200000	-410	673170	-1380.00	na	UR
Thallium	3.2	03TP18-0203-04		U	Iron	200000	-8	673170	-26.93	na	UR
Vanadium	2.6	03TP18-0203-04	71.83		Iron	200000	2	673170	6.73	na	na
Zinc	3.5	03TP18-0203-04	3829		Iron	200000	5	673170	16.83	na	na

**STL-Pittsburgh**  
**Metals Data Reporting Form**

**Interference Check Standard A**

Instrument: ICPST

Units: ug/L

Chart Number: I70518A.ARC

Acceptable Range: 80% - 120%

Standard Source: Inorganic Ventures

Standard ID: MET2386-07

Element	WL/ Mass	Reporting Limit	True Conc	ICSA 5/18/2007 7:45 AM				
				Found	Found	Found	Found	Found
Aluminum	308.215		500000	468000				
Antimony	220.353	10		0				
Arsenic	189.042	10		-1				
Barium	493.409	200		0				
Beryllium	313.042	4		-1				
Cadmium	226.502	5		-1				
Calcium	317.933		500000	478000				
Chromium	267.716	5		1				
Cobalt	228.616	50		0				
Copper	324.753	25		-2				
Iron	271.441		200000	197000				
Lead	220.353	3		0				
Magnesium	279.078		500000	513000				
Manganese	257.61	15		4				
Nickel	231.604	40		2				
Potassium	766.491	5000		184				
Selenium	220.353	5		-1				
Silver	328.068	5		0				
Sodium	330.232	5000		-410				
Thallium	190.864	10		-8				
Vanadium	292.402	50		2				
Zinc	213.856	20		5				

5.04.5

U Result is less than the MDL  
 B Result is between MDL and RL

Form 4 Equivalent

**STL-Pittsburgh**  
**Metals Data Reporting Form**

**Interference Check Standard A**

Instrument: ICPST

Units: ug/L

Chart Number: T70522A.ARC

Acceptable Range: 0% - 0%

Standard Source: Inorganic Ventures

Standard ID: MET2386-07

Element	WL/ Mass	Reporting Limit	True Conc	ICSA				
				5/22/2007 8:17 AM	Found	Found	Found	Found
Antimony	220.353	10		(1 -1)	<IDL			
Cadmium	226.502	5		0				
Chromium	267.716	5		(1 1)	<IDL			
Lead	220.353	3		-2	<IDL			
Sodium	330.232	5000		-350	<IDL			
Thallium	190.864	10		-5				
Vanadium	292.402	50		2				
Zinc	213.856	20		5				

**METHOD BLANK REPORT**

**TOTAL Metals**

**Client Lot #....:** C7E090120

**Matrix.....:** SOLID

<b>PARAMETER</b>	<b>RESULT</b>	<b>REPORTING</b>			<b>METHOD</b>	<b>PREPARATION-</b>	<b>WORK</b>
		<b>LIMIT</b>	<b>UNITS</b>	<b>ANALYSIS DATE</b>			
Lead	ND	0.30	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AU
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	
Magnesium	ND	500	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AP
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	
Manganese	ND	1.5	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AQ
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	
Nickel	ND	4.0	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AT
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	
Potassium	17.3 J	500	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AN
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	
Selenium	ND	0.50	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AW
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	
Silver	ND	0.50	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AA
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	
Sodium	ND	500	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AR
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	
Thallium	ND	1.0	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AX
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	
Vanadium	ND	5.0	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AO
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	
Zinc	0.21 J	2.0	mg/kg	SW846 6010B		05/15-05/18/07	JW0TLL1AI
		Dilution Factor: 1					
		Analysis Time...: 14:34		Analyst ID.....: 022952		Instrument ID...: TRA	

(Continued on next page)

**STL-Pittsburgh**  
**Metals Data Reporting Form**

**Initial Calibration Blank Results**

Instrument: ICPST

Units: ug/L

Chart Number: T70518A.ARC

Standard Source: \_\_\_\_\_

Standard ID: \_\_\_\_\_

Element	WL/ Mass	Report Limit	ICB1 5/18/2007 7:34 AM		Found	Q	Found	Q	Found	Q	Found	Q
			Found	Q								
Aluminum	308.215	200	14.2	U								
Antimony	220.353	10	0.9	U								
Arsenic	189.042	10	2.3	U								
Barium	493.409	200	0.5	B								
Beryllium	313.042	4	0.4	B								
Cadmium	226.502	5	0.5	U								
Calcium	317.933	5000	251.0	U								
Chromium	267.716	5	0.8	U								
Cobalt	228.616	50	0.6	B								
Copper	324.753	25	1.4	U								
Iron	271.441	100	30.0	U								
Lead	220.353	3	1.6	U								
Magnesium	279.078	5000	13.1	U								
Manganese	257.61	15	0.4	B								
Nickel	231.604	40	1.0	U								
Potassium	766.491	5000	500.0	U								
Selenium	220.353	5	2.9	U								
Silver	328.068	5	0.4	U								
Sodium	330.232	5000	-500.0	B								
Thallium	190.864	10	3.2	U								
Vanadium	292.402	50	2.6	U								
Zinc	213.856	20	3.5	U								

5.04.5

U Result is less than the MDL  
 B Result is between MDL and RL

Form 3 Equivalent

**STL-Pittsburgh**  
**Metals Data Reporting Form**

**Continuing Calibration Blank Result**

Instrument: ICPST

Units: ug/L

Chart Number: T70518A.ARC

Standard Source: \_\_\_\_\_

Standard ID: \_\_\_\_\_

Element	WL/ Mass	Report Limit	CCB6 5/18/2007 2:13 PM		CCB7 5/18/2007 3:23 PM		CCB8 5/18/2007 4:29 PM					
			Found	O	Found	O	Found	O	Found	O	Found	O
Aluminum	308.215	200	14.2	U	83.8	B	14.2	U				
Antimony	220.353	10	0.9	U	0.9	U	0.9	U				
Arsenic	189.042	10	2.3	U	2.3	U	2.3	U				
Barium	493.409	200	0.4	U	0.4	U	0.4	U				
Beryllium	313.042	4	0.5	B	0.8	B	0.7	B				
Cadmium	226.502	5	0.5	U	0.5	U	0.5	U				
Calcium	317.933	5000	251.0	U	251.0	U	251.0	U				
Chromium	267.716	5	0.8	U	0.8	U	0.8	U				
Cobalt	228.616	50	0.4	U	0.4	U	0.5	B				
Copper	324.753	25	1.4	U	1.4	U	1.4	U				
Iron	271.441	100	30.0	U	30.0	U	30.0	U				
Lead	220.353	3	1.6	U	1.6	U	1.6	U				
Magnesium	279.078	5000	13.1	U	13.1	U	13.1	U				
Manganese	257.61	15	0.3	U	0.3	U	0.3	U				
Nickel	231.604	40	1.0	U	1.0	U	1.0	U				
Potassium	766.491	5000	500.0	U	500.0	U	500.0	U				
Selenium	220.353	5	2.9	U	2.9	U	2.9	U				
Silver	328.068	.5	0.4	U	0.4	U	0.4	U				
Sodium	330.232	5000	610.0	B	650.0	B	530.0	B				
Thallium	190.864	10	3.2	U	3.2	U	4.8	B				
Vanadium	292.402	50	2.6	U	2.6	U	2.6	U				
Zinc	213.856	20	3.5	U	3.5	U	3.5	U				

5.04.5

U Result is less than the MDL

B Result is between MDL and RL

Form 3 Equivalent

**STL-Pittsburgh**  
**Metals Data Reporting Form**

**Continuing Calibration Blank Result**

Instrument: ICPST

Units: ug/L

Chart Number: T70522A.ARC

Standard Source: \_\_\_\_\_

Standard ID: \_\_\_\_\_

Element	WL/ Mass	Report Limit	CCB1 5/22/2007 9:11 AM		CCB2 5/22/2007 10:17 AM		CCB3 5/22/2007 11:23 AM		CCB4 5/22/2007 12:32 PM		
			Found	Q	Found	Q	Found	Q	Found	Q	
Antimony	220.353	10	( 2.7	B	1.7	B	0.9	U	0.9	U	
Cadmium	226.502	5	0.5	U	0.5	U	0.5	U	0.5	U	
Chromium	267.716	5	0.8	U	0.8	U	0.8	U	0.8	U	
Lead	220.353	3	1.6	U	1.6	U	1.6	U	1.6	U	
Sodium	330.232	5000	-540.0	B	139.0	U	-420.0	B	-380.0	B	
Thallium	190.864	10	( 4.0	B	3.3	B	3.2	U	3.2	U	
Vanadium	292.402	50	2.6	U	2.6	U	2.6	U	2.6	U	
Zinc	213.856	20	3.5	U	3.5	U	3.5	U	3.5	U	

03TP18 - 0203 - 04 only for Sb/Tl

5.04.5

U Result is less than the MDL

Form 3 Equivalent

B Result is between MDL and RL

**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**TOTAL Metals**

**Client Lot #....:** C7E090120

**Date Sampled...:** 05/07/07

**Date Received..:** 05/08/07

**Matrix.....:** SOLID

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
<b>MS Lot-Sample #:</b> C7E080110-002 <b>Prep Batch #....:</b> 7135204							
Aluminum	NC	(80 - 120)			SW846 6010B	05/15-05/18/07 JWF861CG	
	NC	(80 - 120)	(0-20)		SW846 6010B	05/15-05/18/07 JWF861CH	
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP Analyst ID.....: 022952		
		MS Run #.....: 7135136					
Antimony	37 N	(80 - 120)			SW846 6010B	05/15-05/18/07 JWF861DJ	
	46 N,*	(80 - 120) 21	(0-20)		SW846 6010B	05/15-05/18/07 JWF861DK	
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP Analyst ID.....: 022952		
		MS Run #.....: 7135136					
Arsenic	87	(80 - 120)			SW846 6010B	05/15-05/18/07 JWF861CJ	
	90	(80 - 120) 3.2	(0-20)		SW846 6010B	05/15-05/18/07 JWF861CK	
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP Analyst ID.....: 022952		
		MS Run #.....: 7135136					
Barium	94	(80 - 120)			SW846 6010B	05/15-05/18/07 JWF861CL	
	102	(80 - 120) 4.6	(0-20)		SW846 6010B	05/15-05/18/07 JWF861CM	
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP Analyst ID.....: 022952		
		MS Run #.....: 7135136					
Beryllium	93	(80 - 120)			SW846 6010B	05/15-05/18/07 JWF861CN	
	97	(80 - 120) 3.1	(0-20)		SW846 6010B	05/15-05/18/07 JWF861CP	
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP Analyst ID.....: 022952		
		MS Run #.....: 7135136					
Cadmium	84	(80 - 120)			SW846 6010B	05/15-05/18/07 JWF861CT	
	88	(80 - 120) 3.8	(0-20)		SW846 6010B	05/15-05/18/07 JWF861CU	
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP Analyst ID.....: 022952		
		MS Run #.....: 7135136					
Calcium	88	(80 - 120)			SW846 6010B	05/15-05/18/07 JWF861CQ	
	92	(80 - 120) 4.5	(0-20)		SW846 6010B	05/15-05/18/07 JWF861CR	
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP Analyst ID.....: 022952		
		MS Run #.....: 7135136					

(Continued on next page)

**MATRIX SPIKE SAMPLE EVALUATION REPORT**

**TOTAL Metals**

**Client Lot #....:** C7E090120

**Date Sampled....:** 05/07/07

**Date Received..:** 05/08/07

**Matrix.....:** SOLID

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Chromium	99	(80 - 120)			SW846 6010B	05/15-05/18/07	JWF861CX
	100	(80 - 120)	0.64	(0-20)	SW846 6010B	05/15-05/18/07	JWF861C0
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 7135136					
Cobalt	87	(80 - 120)			SW846 6010B	05/15-05/18/07	JWF861CV
	90	(80 - 120)	2.5	(0-20)	SW846 6010B	05/15-05/18/07	JWF861CW
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 7135136					
<b>Copper</b>	110	(80 - 120)			SW846 6010B	05/15-05/18/07	JWF861C1
	122 N	(80 - 120)	5.5	(0-20)	SW846 6010B	05/15-05/18/07	JWF861C2
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 7135136					
Iron	NC	(80 - 120)			SW846 6010B	05/15-05/18/07	JWF861C3
	NC	(80 - 120)		(0-20)	SW846 6010B	05/15-05/18/07	JWF861C4
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 7135136					
Lead	85	(80 - 120)			SW846 6010B	05/15-05/18/07	JWF861DG
	88	(80 - 120)	3.0	(0-20)	SW846 6010B	05/15-05/18/07	JWF861DH
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 7135136					
Magnesium	88	(80 - 120)			SW846 6010B	05/15-05/18/07	JWF861C7
	93	(80 - 120)	4.4	(0-20)	SW846 6010B	05/15-05/18/07	JWF861C8
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 7135136					
Manganese	NC	(80 - 120)			SW846 6010B	05/15-05/18/07	JWF861C9
	NC	(80 - 120)		(0-20)	SW846 6010B	05/15-05/18/07	JWF861DA
		Dilution Factor: 1					
		Analysis Time...: 14:56			Instrument ID...: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 7135136					

(Continued on next page)

## MATRIX SPIKE SAMPLE EVALUATION REPORT

## TOTAL Metals

Client Lot #...: C7E090120

Date Sampled...: 05/08/07

Date Received..: 05/09/07

Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
<b>MS Lot-Sample #:</b> C7E090120-002 <b>Prep Batch #....:</b> 7149212							
Mercury	41 N 42 N	(80 - 120) (80 - 120)	0.70	(0-20)	SW846 7471A SW846 7471A	Moisture.....: 18 05/29/07 05/29/07	JWJLN1CE JWJLN1CF
		Dilution Factor: 1			Analysis Time...: 14:01	Instrument ID.: HGHYDRA	Analyst ID.....: 400491
					MS Run #.....: 7149129		

## NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

EVALUATION OF INORGANIC DUPLICATE ANALYSIS PRECISION

Precision Objectives	Aqueous Solid Air	Compound > or = 5xCRQL/MDL RPD < or = 30% RPD < or = 50% RPD < or = 20%	Compound < or = CRQL/MDL Difference < or = 2xCRQL/MDL Difference < or = CRQL/MDL				
Sample ID:	03TP18-0203-01	03TP18-0203-04					
Laboratory ID:							
Sample Date:	05/08/07	05/08/07					
Duplicate:	03TP18-0203-04	03TP18-0203-01					
PARAMETERS	RESULT mg/Kg	QUAL	RESULT mg/Kg	QUAL	RPD	CRQL/MDL	NOTES
Aluminum	25200		28300		-11.6	0.97	1, IN
Antimony	0.39	UL	0.41	NC	0.39	0.39	2, J
Arsenic	3.8		21	L	62.1	0.4	1, IN
Barium	162		155		4.4	0.12	1, IN
Beryllium	0.98	L	0.67	L	37.6	0.051	1, IN
Cadmium	2.7		13.7		-134.1	0.085	1, J
Calcium	777		1300		-50.4	4.8	1, J
Chromium	14.7		25.2		-52.6	0.11	1, J
Cobalt	9.1		8.4		8.0	0.064	1, IN
Copper	90.5	K	421	K	-129.2	0.14	1, J
Iron	21500		87100		-120.8	2.2	1, J
Lead	688		450		41.8	0.39	1, IN
Magnesium	877		767		13.4	1.2	1, IN
Manganese	738		926		-22.6	0.014	1, IN
Mercury	0.078	UL	0.19	UR	-83.6	0.0086	1, J
Nickel	20.1		33.8		-50.8	0.15	1, J
Potassium	368		249	K	38.6	9.1	1, IN
Silver	1.1		3.7		-108.3	0.036	1, J
Sodium	26.2	L	39	UR	NC	19	2, IN
Vanadium	19.5		17.9		8.6	0.13	1, IN
Zinc	151		954		-145.3	0.21	1, J

NOTES

1 - When both results are > or = 5xCRQL/MDL, the acceptance limit is the relative percent difference must be < or = 30% for aqueous and air samples and must be < 50% for solid samples.

2 - When at least one of the results is < 5x CRQL/MDL, the acceptance limit is the difference between the results must be < or = CRQL/MDL for aqueous and air samples and < or = 2xCRQL/MDL for solid samples.

Q - The qualifier is entered to indicate if the analyte was not detected or qualitatively questionable in the sample.

U - the compound was not detected in the sample at or above the associated numerical value.

NC - The RPD was not calculated because one of the results was not detected; the acceptance limit used is the difference between the results must be < or = CRQL/MDL for aqueous and air samples and < or = 2xCRQL/MDL for solid samples.

J - The positive results should be considered estimated.

B - The result should be considered non-detected or qualitatively questionable due to blank contamination.

IN - The results are acceptable.

COMMENTS

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